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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,380	01/22/2007	Takashi Hasunuma	YH0018-US1	6606

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EXAMINER	
MURALIDAR, RICHARD V	

ART UNIT	PAPER NUMBER
2858	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/578,380	HASUNUMA ET AL.	
	Examiner	Art Unit	
	RICHARD V. MURALIDAR	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-7,10 and 11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-7,10 and 11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 June 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This is a final action on the merits in response to the reply received 12/08/2010. Applicant has amended claims 1 and 5. Claims 3, 8 and 9 are cancelled. Claims 1, 2, 4-7 and 10-11 are pending for examination below.

Specification

2. Claim 1 is objected to because of the following informalities: Line 10 recites, "a low temperature statue". Statue appears to be a typographical mistake. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. **Claims 1, 2, 4-7 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atsushi, Japanese Publication Number 2000-152516 in view of Sato, United States Patent Number 6,700,766, further in view of Myong et al., United States Patent Number 6,356,424.**

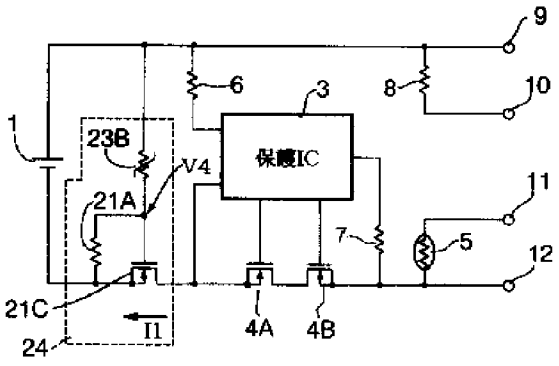
5. With respect to claim 1 (currently amended), Atsushi discloses an overheat protection device **[Drawing 10 see below, temperature protecting circuit 24; par. 0024]** comprising a variable resistive element **[Drawing 10, PTC element 23B; par. 0032]** for which resistance varies depending on temperature **[pars. 0020-0023, 0029-0031]** and which is a PTC element **[par. 0029]**, characterized in that the device further comprises a switching element **[Drawing 10, FET 21C]** which controls a current flowing through an electrical system **[the battery circuit of Drawing 10]** depending on an applied voltage thereto **[par. 0030, 0031]**, and a resistor having a resistance R **[Drawing 10, resistor 21A, at 20Kohms, par. 0023]**, said electrical system comprising a secondary battery **[Drawing 10, battery 1; par. 0020]**, and the variable resistive element is located on and thermally combined with a certain position of the electrical system **[par. 0034]** and interrupts the current flowing through the electrical system by changing the applied voltage to the switching element when the certain position comes to be under a high temperature condition **[par. 0033]**, the variable resistive element having a resistance in a high temperature state P_H **[Drawing 8, upper end of the Kohms scale, at 500K]** and a resistance in a low temperature state P_L, **[Drawing 8, values at the lower end of the Kohms scale]** the relationship between the resistance of the variable resistive element and the resistor being $R/P_H < 1/10$ **[for R=20K, and PH=500K per Drawing 8, R/PH= 20/500= 0.04; 0.04 is < 1/10]**.

6. Atsushi does not explicitly show R/PL > 10; since Atsushi's drawing 8 only explicitly shows a lower Kohms range of approximately 5 or 10K, estimated. However, Atsushi discloses that all variables, such as V (representing the voltage of the battery, V4 (representing the voltage at the voltage divider node in Drawing10), R (used as 20K as an example) and Rth can be varied as desired depending on the application at hand [see pars. 0021, 0022, 0023, 0025, 0027, 0032, 0033]. Therefore, ordinary skill in the art would utilize a variable resistive element (23B Drawing 10) with a resistance having a lower temperature state **PL < 2K ohms**, for the benefit of drawing less current from the battery during monitoring for over temperature, as opposed to using one with a PL of ~5-10K ohms. **For the R=20 K example, this will result in 20/<2; which equals a value >10.**

7. Atsushi does not disclose that the PTC element is a polymer PTC element.

8. Sato discloses a battery protection circuit **[see Abstract]** comprising a PTC element which is a polymer PTC element **[Fig. 26 see below; 203; col. 24 lines 28-57]**. Myong discloses that it is advantageous to use a polymer PTC element with a protection circuit **[Myong, col. 1 lines 29-46]**.

9. Atsushi, Sato and Myong are analogous battery protection circuits that use PTC elements. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the PTC element with a polymer PTC element as taught Sato, into Atsushi's battery protection circuit, for the benefit of utilizing a type of PTC device well-known for its advanced doping properties which protects batteries from over temperature **[Myong, col. 1 lines 29-46]**.



Atsushi's Drawing 10

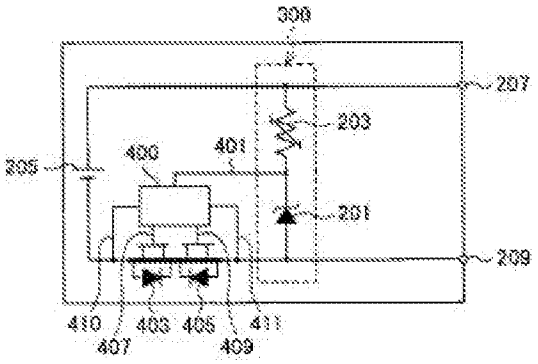


FIG. 26

Sato's Figure 26

10. With respect to claim 2, Atsushi discloses wherein the variable resistive element is located on and thermally combined with the secondary battery **[par. 0034]**.

11. With respect to claim 4, the combination of Atsushi and Sato teach the overheat protection device according to claim 1, but does not explicitly disclose wherein the variable resistive element is composed of a plurality of variable resistive elements which are electrically connected in series with each other.

12. Placing one or more polymer PTC elements in series with the existing PTC element (as in the combination of claim 1) is an obvious and trivial modification. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided

Atsushi's protection circuit with either one or more of a plurality of variable resistive elements in series for the purpose of increasing or decreasing the PTC temperature threshold; i.e. varying the ON/TRIP threshold as desired depending on the application at hand.

13. Additionally, it has been held that mere duplication of the essential working parts of a device (in this case, placing multiple PTC elements in series with each other) involves only routine skill in the art. St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.

14. With respect to claim 5, Atsushi discloses The overheat protection device according to claim 1, wherein the overheat protection device further comprises a resistor **[Drawing 10, 21A]**, the variable resistive element and the resistor are electrically connected in series with each other and in parallel to the electrical system **[as shown in Drawing 10]**, and the switching element **[Drawing 10, 21C]** is electrically connected in parallel to the resistor.

15. With respect to claim 6, Atsushi discloses wherein the switching element is a field effect transistor (FET), a gate of the FET is electrically connected to a position between the variable resistive element and one end of the resistor, a source of the FET is electrically connected to another end of the resistor, the source and a drain of the FET are electrically connected to form a part of an electric circuit comprising the electrical system **[as shown in Drawing 10]**, and when a voltage between the gate and the source of the FET becomes not greater than a threshold value, the current does not substantially flow between the source and the drain of the FET so that the current flowing through the electrical system is interrupted **[par. 0029-0031]**.

16. With respect to claim 7, Atsushi discloses wherein a value of the voltage between the gate and the source is expressed as formula (1): $V_{GS} = R/(P+R) * V0$ wherein VGS is the voltage between the gate and the source, V0 is a voltage across the variable resistive element and the

resistor, P is a resistance of the variable resistive element, and R is a resistance of the resistor variable resistive element, and the R is a resistance of the resistor **[This is the standard formula for calculating voltage across the gate and the source of a transistor, when the transistor is biased as shown in Drawing 10. One of ordinary skill in the art would know how to apply this to Drawing 10 in order to determine the applicable Vgs, particularly in combination with the voltage divider formulas given in par. 0021 and 0027]**.

17. With respect to claim 10, Atsushi discloses an electrical system comprising the overheat protection device according to claim 1 **[the battery system of Drawing 10]**.

18. With respect to claim 11, Atsushi discloses wherein the secondary battery **[Drawing 1, 1]** is electrically connected to an electrical element **[Drawing 1, terminals 9 and 12]** to form an electric circuit, and the overheat protection device is connected in parallel to and between the secondary battery and the electrical element **[as shown in Drawing 10]**.

Response to Arguments

19. Applicant's arguments filed 12/08/2010 have been fully considered but they are not persuasive. Applicant comments on page 5 of REMARKS "Atsushi does not teach the presence of a polymer PTC element. Neither does Atsushi teach that the relationship between the resistor and the variable resistor should be $R/P_L > 10$ and R/P_H 1/10."

20. The examiner notes that Atsushi discloses the variable resistive PTC element 23B in Drawing 10, but does not disclose that 23B is a polymer PTC type element. Sato is used to teach the polymer PTC element, at Fig. 26, 203 col. 24 lines 28-57. Explicit motivation to utilize

Sato's polymer PTC element 203 with Atsushi is provided by Myong, as given in the action above.

21. Atsushi explicitly discloses the relationship between the resistor and the variable resistor should be **$R/P_H < 1/10$**. In examining Drawing 8 [and pars. 0029, 0030-0033], the examiner notes that for 21A, R=20K [par. 0023] and P_H=500K [per Drawing 8], then R/P_H= 20/500= 0.04 which is < 1/10.

22. For **$R/P_L > 10$**, Atsushi's drawing 8 only explicitly shows a lower Kohms range of approximately 5 or 10K (estimated). However, Atsushi discloses that all variables, such as V (representing the voltage of the battery, V4 (representing the voltage at the voltage divider node in Drawing10), R (used as 20K as an example) and Rth (equated to be **P_L and P_H** depending on the temperature) can be varied as desired depending on the application at hand [see pars. 0021, 0022, 0023, 0025, 0027, 0032, 0033]. The examiner notes that selecting a variable resistive element (such as Atsushi's 23B, Drawing 10) having a lower temperature state resistance P_L < 2K ohms will automatically result in **$R/P_L > 10$**, since 20/<2 yields a number > 10**. O**rdinary skill in the art would select a variable resistive element with a lower temperature state resistance P_L < 2K ohms for the benefit of drawing less current from the battery during monitoring for over temperature, as opposed to using one with a P_L of ~5-10K ohms. As is well-known in the art, a voltage divider utilizing lower value resistances will result in less parasitic drain from the battery, and thus more battery power available to the user.

23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

24. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RICHARD V. MURALIDAR whose telephone number is (571)272-8933. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Assouad can be reached on 571-272-2210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

26. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Richard V Muralidar/
Examiner, Art Unit 2858